

EPA ID: MAD000133496 Site Name: TITEFLEX

State ID:

Alias Site Names: TITEFLEX

City: SPRINGFIELD

County or Parish: HAMPDEN

State: MA

Refer to Report Dated: 11/13/98

Report Type: Site Inspection Prioritization 001

Report Developed by: START

**DECISION:**

☒ 1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:

☒ 1a. Site does not qualify for further remedial site assessment under CERCLA (No Further Remedial Action Planned - NFRAP)

☐ 1b. Site may qualify for action, but is deferred to:

☐ 2. Further Assessment Needed Under CERCLA:

2a. Priority: ☐ Higher ☐ Lower

2b. Other: (recommended action)

Superfund Records Center

SITE: TITEFLEX

BREAK: 1.3

OTHER: 606173

**DISCUSSION/RATIONALE:**

Site is not eligible for further consideration as an NPL candidate. No further action is anticipated by Superfund Site Assessment program.



SEMS DocID 606173

Site Decision Made by: NANCY SMITH

Signature: \_\_\_\_\_

*Nancy Smith*

Date: 11/20/98

**FINAL SITE INSPECTION PRIORITIZATION REPORT  
FOR  
TITEFLEX CORPORATION  
SPRINGFIELD, MASSACHUSETTS**

Prepared For:  
U.S. Environmental Protection Agency  
Region I  
Office of Site Remediation and Restoration  
John F. Kennedy Federal Building  
Boston, MA 02203-0001


CONTRACT NO. 68-W5-0009

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TDD No. 98-05-0161  
PCS NO. 5194  
DC NO. A-3332

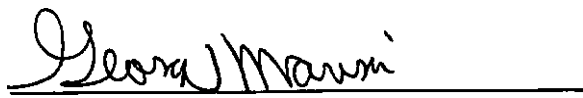
Submitted By:  
Roy F. Weston, Inc. (WESTON®)  
Superfund Technical Assessment and Response Team (START)  
217 Middlesex Turnpike  
Burlington, MA 01803

13 November 1998


Region I START  
Reviewed and Approved:

  
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13 November 1998  
Date

  
George Mavris  
Project Leader

13 NOVEMBER 1998  
Date

  
QA Review

13 NOVEMBER 1998  
Date

## **DISCLAIMER**

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## **INTRODUCTION**

The Roy F. Weston, Inc. (WESTON®), Superfund Technical Assessment and Response Team (START) was requested by the U.S. Environmental Protection Agency Region I (EPA Region I), Office of Site Remediation and Restoration to perform a Site Inspection Prioritization (SIP) of the Titeflex Corporation property at 603 Hendee Street in Springfield, Massachusetts. Tasks were conducted in accordance with the SIP scope of work and technical specifications provided by EPA Region I. A Preliminary Assessment (PA) Report for the Titeflex Corporation property was prepared by the Massachusetts Department of Environmental Quality Engineering (MA DEQE) in September 1990. The PA outlined the results of previous investigations which indicated the existence of volatile organic compounds in groundwater beneath the property. A Site Investigation (SI) was completed on the property by the Massachusetts Department of Environmental Protection (MA DEP) on 30 September 1992. On the basis of the information provided in the PA and SI Reports, the Titeflex Corporation SIP was initiated.

Background information used in the generation of this report was obtained through file searches conducted at the EPA Region I, MA DEP, telephone interviews with town officials, conversations with persons knowledgeable of the Titeflex Corporation property, and conversations with other Federal, State, and local agencies.

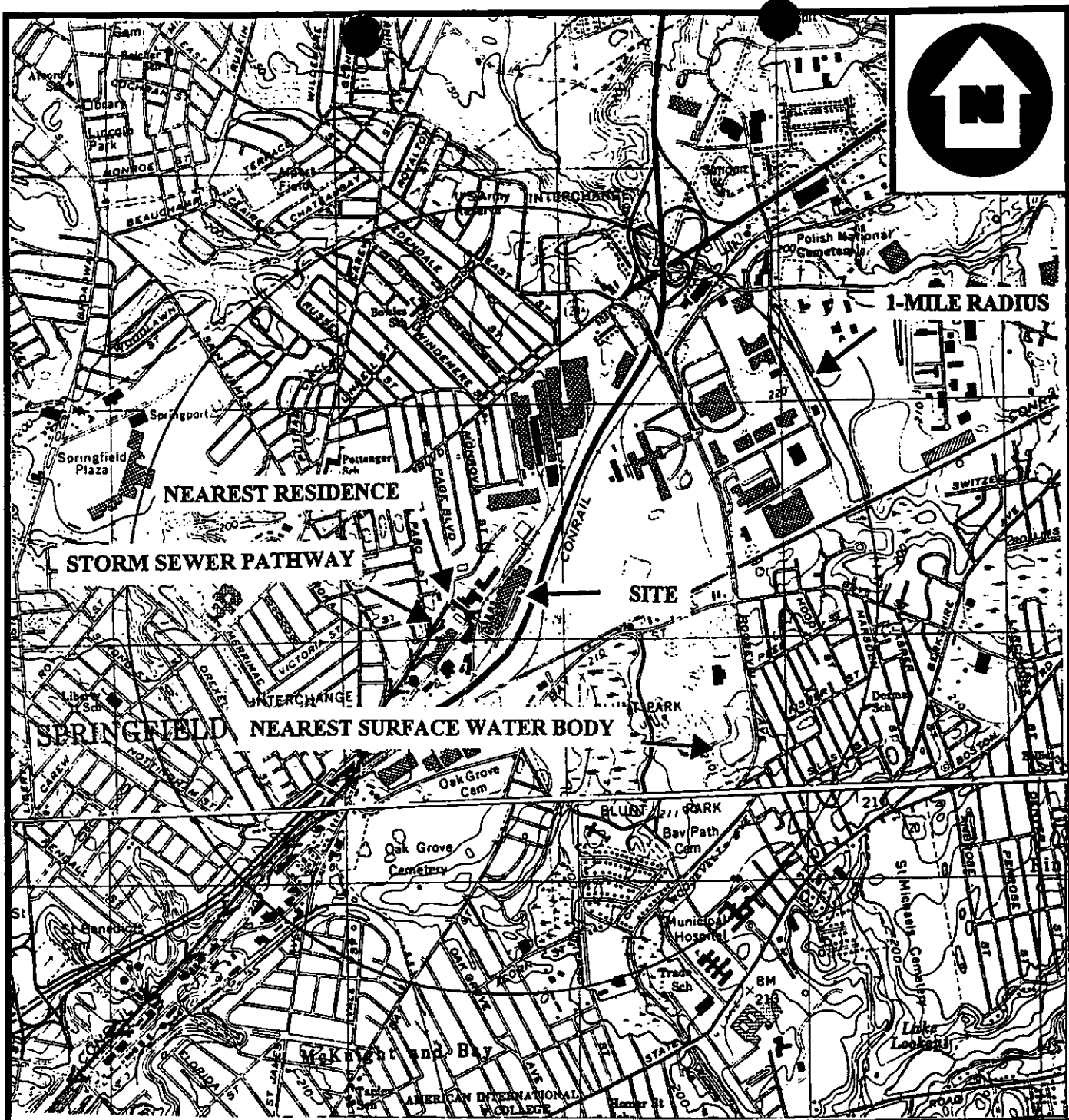
This package follows the guidelines developed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, commonly referred to as Superfund. However, these documents do not necessarily fulfill the requirements of other EPA Region I regulations such as those under the Resource Conservation and Recovery Act (RCRA) or other Federal, State, or local regulations. SIPs are intended to provide a preliminary screening of sites to facilitate EPA Region I's assignment of site priorities. They are limited efforts and are not intended to supersede more detailed investigations.

## **SITE DESCRIPTION**

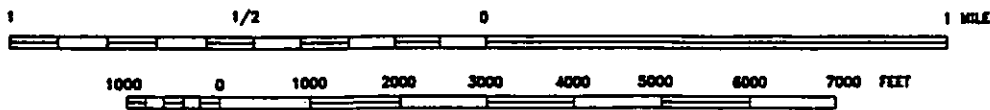
The Titeflex Corporation (Titeflex) property is located at 603 Hendee Street in Springfield, Hampden County, Massachusetts at latitude 42° 08' 06.0" north and longitude 72° 33' 25.9" west (Figure 1) [1]. The property is identified on Town of Springfield Tax Map No. 16 as Block No. 11 and comprises 14.125 acres [2].

The area surrounding the property is mixed commercial and residential. The property is bordered by railroad tracks to the west, the Indian Motorcycle Museum to the south, Interstate 291 to the southeast, and a trucking company and commercial lot to the north (Figure 2). Private residences are located approximately 750 feet (ft) northwest of the property along Page Boulevard. Topography of the property is generally flat, with a slight slope radiating away from the central manufacturing building which comprises approximately half the property.

Note : Text in italics indicates portions of the original Massachusetts Department of Environmental Quality Engineering (MA DEQE) 28 September 1990 Preliminary Assessment Report which were either copied or paraphrased.



BASE MAP IS A PORTION OF THE FOLLOWING 7.5 X 15' U.S.G.S. QUADRANGLE(S):  
 SPRINGFIELD NORTH AND SPRINGFIELD SOUTH, MASSACHUSETTS 1979.



### LOCATION MAP

TITFLEX CORPORATION  
 603 HENDEE STREET  
 SPRINGFIELD, MASSACHUSETTS

**WESTON®**  
 MANAGERS DESIGNERS/CONSULTANTS

REGION I SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

|                     |                       |              |
|---------------------|-----------------------|--------------|
| TOD #<br>98-05-0161 | DRAWN BY:<br>B. BOWEN | DATE<br>4/98 |
|---------------------|-----------------------|--------------|

FILE NAME:  
 S:\97110004\FIG1.DWG

FIGURE 1





A second on-site building is located on the property southwest of the central main building (Figure 2) [6]. A small portion of the northern side of the Titeflex main building is currently being subleased to Solar Metal Treating Corp. (SMTC).

START personnel conducted an on-site reconnaissance of the Titeflex property on 2 April 1998. During reconnaissance activities, START personnel inspected the on-site facility and property for potential source areas [6]. The portion of the building leased to SMTC was not inspected. See Figure 2 for the location of each of the areas discussed in the following sections.

Currently the property is mostly paved and consists of a main manufacturing building occupying approximately 7 of the 14 acres. The footprint of the main manufacturing building measures approximately 200 ft by 650 ft. A second building, measuring approximately 80 ft by 200 ft, is located southwest of the main building. The property is bounded on all four sides by a chain-link fence and gates to limit access. There are also smaller fenced-off areas within the property to limit access to some of the process areas [6].

A 55-gallon No. 2 cutting oil drum is located on a stand outside of the building supplying the boiler room with cutting oil. South of the engineering area is the former location of two 5,000-gallon heating oil USTs, as well as the current location of a 20,000-gallon UST. Currently, two decommissioned 5,000-gallon heating oil USTs are located adjacent to the chimney. The 20,000-gallon heating oil UST is currently located approximately 100 ft south of the chimney. A storm drain is located 20 ft southwest of the UST area, and surface drainage from the southern portion of the property is sloped to drain to this area. Also, located approximately 150 ft south of the heating oil UST is a 10,000-gallon tank containing Isopar G, a petroleum naphtha compound. Isopar-G is currently used in processes within the main building [6; 30, p. 1].

Located on the south side of the main building are two aboveground storage tanks (ASTs). One is a 1,000-gallon carbon dioxide AST that formerly supplied internal processes and the other AST is a trailer-mounted hydrogen supply tank [30, p. 2]. Oily metal chip storage Dumpsters are also located along the south side of the building. These Dumpsters are located on a concrete pad with a permanent roof. A catchbasin is located in the concrete pad beneath the dumpsters, and was designed to capture any oil draining from the Dumpsters [6]. The catchbasin does not have a drain and was empty during the START on-site reconnaissance.

The east side of the building is the only portion of the property that is not paved. Three piles of mixed construction and trash debris was observed in this area during the START on-site reconnaissance [6]. The southern pile was approximately 75 ft in diameter and approximately 3 ft high. The pile consisted of soil, bricks, branches, asphalt, and pallets. The centrally located pile was approximately 50 ft in diameter and approximately 3 ft high, and consisted of asphalt shingles, pipes, trash, and soil. The northern pile was approximately 75 ft in diameter and 4 ft high. This pile consisted of bricks, asphalt, automobile tires, wood, metal, and soil. According to Titeflex personnel, the three debris piles were removed and disposed off site approximately 2 weeks after the START on-site reconnaissance (2 April 1998) [30, p. 1]. This area has also been fenced in according to Titeflex to prevent further dumping by trespassers. Also located in this area are three metal cargo boxes that are being used to store unused equipment and wooden pallets [6].

The current drum storage area and the hazardous materials storage area are located on the northern side of the building. The hazardous materials area is located inside the main manufacturing building, although it can only be accessed from outside the building. The hazardous materials storage area has a water evaporator for removing the water from cutting oils collected for disposal. The floor of the hazardous materials storage room is concrete and sloped in a manner as to collect any spilled material in the center of the room. During the START on-site reconnaissance, six 275-gallon waste cutting oil ASTs and 17 55-gallon drums of waste oil were observed in the room [6; 30, p. 1]. The 2,000-gallon virgin cutting oil UST is located outside the hazardous materials storage area [6].

Also located on the north central portion of the building is the area leased to SMTC. SMTC treats metal parts for Titeflex and for other clients. Located outside of SMTC were 14 55-gallon drums labeled "Methanol". These empty drums were not located in a bermed area, but did appear to be empty and in good condition [6].

The Titeflex drum storage area is located approximately 150 ft west of the SMTC area. This area is separated into three sections based on the type of chemicals. All three areas were observed to have concrete floors and berms in good condition, with a roof and no floor drains. The first area is the flammable storage area, which contained 15 55-gallon steel drums labeled "flammable material". The adjacent section was the virgin oil storage area, which contained 18 55-gallon steel drums. The third section contained 34 55-gallon plastic drums labeled "corrosive materials" [6].

The interior of the building is separated into 41 areas based on the processes conducted. During the on-site reconnaissance, START observed 18 areas in the main manufacturing building that contained or utilized source materials. The Carpenter Shop area had 1 gallon of denatured alcohol, numerous paint cans, oils, and two metal oily rag drums. The Research and Development area had 17 55-gallon sealed drums of oil, and three drums containing oily rags. The boiler room had 12 55-gallon drums, some of which were without lids, and numerous smaller containers which appeared to contain oil. The Rubber Molding area had five 55-gallon sealed drums of cutting oil and several oily rag drums. The Rubber Molding Area includes a priming firesleeve dip painting room that operates under negative air pressure [6; 30, p. 2].

The acidic parts cleaning and anodizing area is constructed with a brick floor with a series of plastic and steel grates raising the floor approximately 2 inches. This room is designed to channel overflow from the parts-washing bins to flow across the floor to a central sump location, where the overflow is pumped into a temporary storage AST. The 1,500-gallon temporary water storage AST discharges to the town storm drain and is regulated by a discharge permit. According to Titeflex personnel, the total amount of discharged water sent into the town sewer is approximately 100,000 gallons per day [6; 30, p. 2]. There were also two sealed drums of cutting oil located in this area. This area was also the former vapor degreasing area which utilized trichloroethylene (TCE) for part cleaning operations until TCE use was discontinued in 1988. A 500-gallon TCE AST and ancillary piping have been removed, and the only remaining feature is a concrete secondary containment berm [6].

The computer-controlled lathe area contained 35 55-gallon drums of cutting oil. Each of the metal lathes also has a metal pan beneath the machine to contain any spilled oil and metal cuttings. The wire braiding area has one 55-gallon drum labeled "hazardous waste", and one 55 gallon drum labeled "cutting oil". The MR11 room is another wire braiding room added to the east side of the main building in 1990; this area contains four 55-gallon drums of cutting oil [6].

Nineteen on-site monitoring wells were observed during the on-site reconnaissance. The four off-site monitoring wells, discussed further in the Groundwater Pathway section, were not visible on the two adjacent properties from the Titeflex property [6; 30, p. 2].

Stormwater runoff and surface drainage from the roof drains flow toward the stormwater drains located in the parking lot. Stormwater drainage then flows to the north under Hendee Street in the town storm drain system, and eventually discharges into the Connecticut River, approximately 2.5 miles from the property [4; p. 2].

## OPERATIONAL AND REGULATORY HISTORY AND WASTE CHARACTERISTICS

Indian Motorcycle Manufacturing (IMM) owned the property from an unspecified date to 1954, during which time motorcycles were manufactured under the name Indian Motorcycles [6].

In 1954, the Titeflex Corporation was purchased by Atlas Corporation and relocated to the former IMM property. On 31 May 1978, Titeflex Corporation became a wholly owned subsidiary of Bundy Corporation. TI Corporation (TI Corp.) has owned the property from 1989 to the present, and has operated its subsidiary company Titeflex Corporation on site from approximately 1989 to the present. A portion of the original IMM facility and property was not sold to TI Corp., and was converted into a museum which still operates west of the main manufacturing building [30].

*Titeflex is a manufacturer of high pressure hoses which include Teflon hose, stainless steel tubing, and associated fittings. Teflon hose is produced by mixing Teflon powder with a lubricant, extruding, and oven curing the product. Stainless steel tubing is formed from stainless steel stock. Fittings are machined and cleaned in a separate portion of the facility. Approximately 3,000 to 5,000 gallons of waste oil (coolant, lube, and cutting) are generated per year. A vapor degreaser for cleaning fittings formerly generated approximately 1,000 gallons of waste TCE per year and was operated until 1987. Fittings are also cleaned with hydrochloric acid, hydrofluoric acid, phosphoric acid, sulfuric acid, nitric acid, and sodium hydroxide. Acids and caustics, from an unspecified date to the present, are partially neutralized prior to discharge to the municipal sewer system.*

*A deburring, or "tumbling" room, used to round off edges on fitting parts, generated approximately 300 gallons of sludge per year. Titeflex reported that the sludge was disposed of at a local landfill. Other oil and hazardous materials formerly used or stored on site include 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride, freon, polychlorinated biphenyls (PCBs), water-soluble coolants, mineral spirits, bromoform, potassium ferrocyanide, nickel salt, petroleum naphtha, No. 6 and No. 4 fuel oil, and waste oil. The use of TCE was discontinued at the facility in 1988. Waste solvents, oils, and other materials are currently stored in 55-gallon drums in an area at the north end of the property for a period not exceeding 90 days. Titeflex is currently listed under RCRA as a large quantity generator. A historical summary for Titeflex is provided in Table 1 [25].*

**Table 1**

**Historical Summary for Titeflex Corporation**

| Date              | Event  |
|-------------------|--|
| 17 July 1985      | Upon verbal notification by Titeflex, Massachusetts Department of Environmental Quality Engineering (MA DEQE) personnel investigated a subsurface oil collection system, consisting of an underground storage tank (UST) with french drains, in the "oily metal chip shed area" of the facility. The system was designed to collect oil which had historically leached into the ground from dumpsters used to store oil-soaked metal chips. The system was reportedly installed in 1970. MA DEQE issued a Notice of Responsibility (NOR) to Titeflex for the investigation and cleanup of the oil release in the "oily metal chip shed area" on 25 October 1985 [4]. |
| March 1986        | Titeflex's environmental consultant, Tighe & Bond, submitted the results of soil sampling, monitoring well installation, and groundwater sampling in the "oily metal chip shed area". Oil and grease contamination was found in the soil. Monitoring wells MW-1S, MW-2S, MW-3S, MW-4S, and MW-5S were installed. Monitoring well MW-6S was subsequently installed in June 1986 [4, p. 1-3].  |
| May 1986          | The metal chip oil collection system and contaminated soils were excavated and disposed [4, p. 1-1].   |
| July 1986         | Oil-contaminated soils were observed during the routine removal of two heating oil underground storage tanks (USTs) located southwest of the main building. Of the four heating oil USTs located in that area, two 5,000-gallon USTs were removed, but it was determined that the second two USTs were too close to the foundation of the chimney to be excavated. The two USTs were decommissioned in situ by draining, washing, and filling them with concrete. Approximately 600 cubic yards of contaminated soil were removed prior to the installation of the new 20,000-gallon heating oil UST, installed in the excavation [4, p. 1-4].                       |
| July 1986         | Tighe & Bond submitted to MA DEQE the results of additional well installation and groundwater sampling. High levels of volatile organic compounds (VOCs) were detected in on-site groundwater samples [4, p. 2-9].   |
| July-August 1986  | Two leaking USTs, containing No. 4 and No. 6 fuel oil, and approximately 600 cubic yards of fuel-oil-contaminated soil associated with the USTs were removed from the southeast side of the facility. MA DEQE issued a notice of responsibility (NOR) to Titeflex for the investigation and cleanup of the area of the leaking USTs on 8 August 1986 [4, p. 1-4].  |
| 1 March 1987      | Tighe & Bond completed an Interim Progress Report, Groundwater Quality and Soil Assessment Study [28].   |
| 10 September 1987 | MA DEQE approved Tighe & Bond's proposal to install and sample additional monitoring wells to define the extent of the VOC plume [5, p. 10].   |
| 18 May 1988       | Titeflex notified MA DEQE of a cutting oil discharge into a drainage swale which had been ongoing since 1975 [16].   |

**Table 1**

**Historical Summary for Titeflex Corporation (Concluded)**

| Date              | Event  |
|-------------------|--|
| 13 June 1988      | Titeflex submitted results of an investigation of the oil discharge to the drainage swale. The discharge was ceased, and the storm drain was connected to the town storm drain lines [16].   |
| February 1989     | MA DEQE issued a NOR to Titeflex for the oil discharge to the drainage swale [16].   |
| August 1988       | Tighe & Bond submitted a Phase II Remedial Investigation to MA DEQE [5].   |
| 29 June 1989      | Tighe & Bond submitted a Phase II Comprehensive Site Assessment to MA DEQE [28].   |
| August 1989       | Tighe & Bond submitted a Phase I Limited Site Investigation for the oil-contaminated drainage swale. Reportedly, MA DEQE considered this to be a separate site, due to the fact that it is off site and separate from the VOC plumes [16]. |
| 11 October 1989   | Approximately 300 gallons of naphtha (Isopar G) were spilled on the southeast side of the facility in a parking lot and on adjoining land [16].  |
| September 1990    | Tighe & Bond submitted a Scope of Work for the completion of a revised Risk Assessment to MA DEQE under the Massachusetts Contingency Plan (MCP). The Scope of Work was approved by MA DEQE [16].  |
| 28 September 1990 | MA DEQE completed a Preliminary Assessment for the Titeflex property [16].   |
| 28 January 1991   | Environmental Science & Engineering, Inc. Submitted a Disposal Site Risk Characterization to MA DEP [28]   |
| October 1993      | Massachusetts Department of Environmental Protection (MA DEP) (formerly MA DEQE) Issued an Oversight Waiver for the Titeflex property under the MCP [16].  |
| August 1994       | Tighe & Bond submitted a Waiver Submission for Titeflex Corporation, Springfield, Massachusetts: Phase III Report For Groundwater Site #1-0209 [28].   |
| November 1994     | Tighe & Bond submitted an annual report, including a copy of the Risk Assessment, for the Titeflex property summarizing the 1992 and 1994 groundwater sampling events [9].   |
| April 1995        | Tighe & Bond Submitted a Response Action Outcome For Titeflex Corporation State Route 290-E Wetlands Remediation Site ID-0699  |
| April 1997        | Tighe & Bond submitted a Waiver Completion Statement for Titeflex Corporation.   |

[5; 9; 16; 28]

On 28 September 1990, a PA was completed for the Titeflex property by the Massachusetts MA DEQE. At the time of the 1990 PA, the facility was classified as a large quantity generator under RCRA. The facility reportedly discharged wastewater to the Springfield Municipal Sewer System in accordance with the requirements of the Bondi's Island Wastewater Treatment Plant [16, p. 3].

Petroleum-based oil and volatile organic compounds (VOCs) have been documented in on-site soils and groundwater during several rounds of sampling from April 1986 through August 1996. In addition, metals were detected in soil/sediment samples collected from the drainage swale.

Groundwater and surficial soil analytical results, as well as remedial actions undertaken to address groundwater and soil contamination, are discussed in the Groundwater Pathway and Soil Exposure Pathway sections, respectively.

The source of the VOC contamination on the property has not been conclusively determined. Results from previous investigations conducted by Tighe & Bond on the property concluded that the VOC contamination found in on-site monitoring wells is generally believed to have resulted from the on-site use of TCE in connection with former operations conducted at the Titeflex Building. These operations included the use of organic solvents, such as industrial grades of TCE for cleaning metal parts. The source of the groundwater contamination is believed to be the former TCE degreasing tank. No indication of direct disposal for organic solvents on site or through the storm sewer line has been documented. Other VOCs are suspected of having been present as impurities in the initial TCE product or as degradation products [16].

Remediation activities conducted at the Titeflex facility to date include the following: excavation of contaminated soils associated with the removal of the two heating oil USTs located south of the main manufacturing building; excavation of waste-oil-contaminated soils located along the drainage swale adjacent to Route 291; removal and clay-and-asphalt capping of waste-oil-contaminated soil in the former "oily metal chip shed area"; and implementation of a groundwater and soil gas monitoring program [27; 28].

Table 2 presents identified structures or areas on the Titeflex Corporation property that are documented or potential sources of contamination, the containment factors associated with each source, and the relative location of each source.

**Table 2**  
**Source Evaluation for Titeflex Corporation**

| Source Area                          | Containment Factors     | Spatial Location                      |
|--------------------------------------|-------------------------|---------------------------------------|
| Drainage Swale                       | Remediated              | South of main manufacturing plant     |
| Drums                                | Asphalt, Concrete Berms | Throughout both buildings             |
| Metal Chip Shed Area                 | Asphalt and clay cap    | South of main manufacturing plant     |
| Former No. 4 and No. 6 Fuel Oil USTs | Asphalt cap             | Southwest of main manufacturing plant |
| Former No. 6 Fuel Oil USTs           | Asphalt cap             | Southwest of main manufacturing plant |
| Current No. 6 Fuel Oil UST           | Asphalt cap             | Southwest of main manufacturing plant |

**Table 2**  
**Source Evaluation for Titeflex Corporation**  
**(Concluded)**

| Source Area            | Containment Factors | Spatial Location                       |
|------------------------|---------------------|--|
| Former Degreasing Tank | Concrete Pad        | Within the main manufacturing building |
| Cutting Oil            | Asphalt cap         | North of main manufacturing plant      |
| Carbon Dioxide Tank    | None                | South of main manufacturing plant      |
| Isopar-G Tank          | Asphalt cap         | South of research and design building  |
| Tank (Hydrogen)        | None                | South of main manufacturing plant      |
| Piles                  | Removed*            | Southeast of main manufacturing plant  |
| Isopar-G Spill         | Asphalt cap         | Southwest of main manufacturing plant  |
| Buffered Water Tank    | Concrete Pad        | Within the main manufacturing plant    |

UST = Underground Storage Tank  
[6; 27]

\* According to Titeflex personnel, the three debris piles were removed and disposed off site approximately 2 weeks after the START on-site reconnaissance (2 April 1998) [30, p. 2].

Table 3 summarizes the types of potentially hazardous substances which have been disposed, used, or stored on the Titeflex Corporation property.

**Table 3**

**Hazardous Waste Quantity for Titeflex Corporation**

| Substance                | Quantity<br>or Volume/Area | Years of<br>Use/Storage | Years of<br>Disposal | Source Area                                  |
|--------------------------|----------------------------|-------------------------|----------------------|--|
| Waste Cutting Oil        | 48 yd <sup>3</sup>         | Unknown - Current       | 1970 - 1986          | Drainage Swale                               |
| Waste Cutting Oil        | Unknown                    | Unknown - Current       | 1970 - 1986          | Oily Metal Chip Area                         |
| No. 4 and No. 6 Fuel Oil | 600 yd <sup>3</sup>        | Unknown - 1986          | Unknown - 1986       | Tanks (Former No. 4 and No. 6 Fuel Oil USTs) |
| No. 6 Fuel Oil           | 5,000 gallons              | Unknown - Current       | Unknown - 1986       | Tanks (Former No. 6 Fuel Oil USTs)           |
| No. 6 Fuel Oil           | 5,000 gallons              | Unknown - Current       | Unknown - 1986       | Tank (Current No. 6 Fuel Oil UST)            |
| TCE                      | 500 gallons                | Unknown - 1987          | Unknown              | Tank (Former Degreasing Tank)                |
| Cutting Oil              | 2,000 gallons              | Unknown - Current       | Unknown              | Tank (Cutting Oil)                           |
| Carbon Dioxide*          | 1,000 gallons              | Unknown - Current       | Unknown              | Tank (Carbon Dioxide)                        |
| Isopar-G                 | 10,000 gallons             | Unknown - Current       | Unknown              | Tank (Isopar-G)                              |
| Hydrogen                 | 1,000 gallons              | Unknown - Current       | Unknown              | Tank (Hydrogen)                              |
| Piles                    | 11,720 ft <sup>3</sup>     | Unknown - Current       | Unknown              | Piles (Piles)                                |
| Isopar-G                 | 300 gallons                | Unknown - Current       | Unknown              | Other (Isopar-G Spill)                       |
| Buffered Water Tank      | 1,500 gallons              | Unknown - Current       | Unknown              | Buffered Water Tank                          |

UST = underground storage tank

yd<sup>3</sup> = cubic yards

ft<sup>3</sup> = cubic feet

\* According to Titeflex personnel, the carbon dioxide tank has been decommissioned and the piles of soil have been removed [30, p. 2].

[6; 16]

The Titeflex property is bounded to the west by a railroad bed, and a trucking company and fuel oil distributor are located to the north. Other potential off-site sources of contamination include properties listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and the Resource Conservation and Recovery Information System (RCRIS). The Smith & Wesson Academy and the Smith & Wesson Inc. are both CERCLIS-listed properties located within 1-radial mile of the Titeflex property [26]. There are 258 RCRA notifiers located in the Town of Springfield, Massachusetts [25].



## WASTE/SOURCE SAMPLING

Soil gas samples were collected from soil borings advanced in each of the following locations: the former drum storage area adjacent to MW-T-2S (area 1); the former AST degreasing tank (area 2); a floor drain that was connected to the sewer system (area 3); the current drum storage area (area 4); and the extrusion area and former drum storage area (area 5). An MSA Chem-Air<sup>TM</sup> pump and TCE detector tubes were used for the analysis. The results ranged from below the method detection limit at drum storage areas Nos. 1 and 4, to 9 parts per million (ppm) at drum storage area No. 5, and 50 ppm at drum storage area No. 3. TCE was detected at greater than 600 ppm at area No. 2 adjacent to the degreasing AST [5, p. 9].

A soil boring investigation conducted by Tighe & Bond on 12 and 13 December 1986 focused on the fuel oil USTs located on the southwest portion of the property. A total of 55 soil samples were collected at 13 different soil boring locations. Soil samples were collected starting at 2 ft below ground surface (bgs), and the boring was advanced to the groundwater interface [4, p. 14]. Samples were analyzed for oil and grease on a dry weight basis [4, p. 15]. Concentrations of oil and grease ranged from below the method detection limit of 0.05 milligrams per kilogram (mg/kg) to 6.3 mg/kg [4, p. 16].

Titeflex has estimated that approximately 3,500 gallons of waste cutting oil were released to the drainage swale along the southeast property boundary through the storm drain system from 1970 to 1988. This discharge was ceased by Titeflex in 1988 and was reported to the DEP. In June 1989, approximately 1,200 gallons of oil were pumped from the storm drain system.

Surficial soil/sediment sampling events and remedial activities undertaken to address contaminated soils are discussed further in the Soil Exposure Pathway section of this report.

## GROUNDWATER PATHWAY

Titeflex is located on a central lobe of the Chicopee Delta. The Chicopee Delta was deposited during the Pleistocene Epoch by streams and rivers flowing west into glacial lake Hitchcock from the highlands to the east [5, p. 11].

The majority of the soils on the Titeflex property have been mapped as Chicopee Delta deltaic deposits. The deltaic deposits consist of tan sands and gravels to a depth of 41 to 47 ft. There is vertical and lateral variability from fine sand to very coarse sand and pebble gravel units. At a depth of 41 to 47 ft, a 2- to 6-foot thick gray sandy-silt to clayey-silt layer occurs. Lenses of till and red-brown staining occur in the gray clayey-silt. Below the gray clayey-silt, a red-brown dense till occurs from 44 to 49 ft [5, p. 11]. Over a 30-year period, from 1960 to 1990, the mean annual precipitation at Springfield, Massachusetts was approximately 42 inches [18, p. 5]. Bedrock underlying the Titeflex property consists of the Portland Formation. This formation has been described as a reddish-brown to pale-brown arkose and siltstone [17]. The depth to bedrock beneath the site is unknown but is greater than (>) 50 ft based on groundwater well boring logs [4, p. 11]. According to Titeflex personnel, the Titeflex facility is "on something of a divide, with groundwater also flowing northwesterly up Hendee Street" [30, p. 2].

Groundwater beneath the Titeflex property was encountered between 10.51 and 12.30 ft bgs. Groundwater beneath the Titeflex property reportedly flows to the southwest [4, p. 13]. The average groundwater slope across the site is 0.0030 ft/ft, and the average groundwater velocity ranges from 0.010 ft/day to 0.056 ft/day [4, p. 11].

Massachusetts cities and towns located within 4-radial miles of the Titeflex property include Springfield, West Springfield, Chicopee, and Ludlow [1; 22; 23; 24].

The entire population of Springfield and West Springfield relies on surface water from the Cobble Mountain Reservoir, located approximately 15 miles upgradient and west of the site, for their drinking water supply [15]. The Town of Chicopee obtains its drinking water from the Quabbin Reservoir, located approximately 25 miles to the northeast of the property, and has no public or community groundwater or surface water supplies within the town [20]. The Town of Ludlow obtains drinking water from Springfield. The Titeflex property does not lie within a wellhead protection area [15].

Private groundwater supplies located within 4-radial miles of the property were estimated using equal distribution calculations of U.S. Census CENTRACTS data identifying population, households, and private water wells for "Block Groups" which lie within or partially within individual radial distance rings measured from the Titeflex property. The total population that relies on groundwater within 4-radial miles of the Titeflex property is 595 [7]. There are no known private wells located within 0.5-radial miles of the Titeflex property [7]. Table 4 describes the estimated drinking water populations served by groundwater sources located within 4-radial miles of the Titeflex property.

**Table 4**

**Estimated Drinking Water Populations Served by Groundwater Sources  
Within 4-Radial Miles of Titeflex Corporation**

| Radial Distance from<br>Titeflex Corporation (miles) | Estimated Population<br>Served by Private<br>Wells | Estimated Population<br>Served by Public<br>Wells | Total Estimated<br>Population Served by<br>Groundwater Sources<br>Within the Ring |
|--|--|---|---|
| ≥0.00 to 0.25  | 0  | 0   | 0   |
| >0.25 to 0.50  | 0  | 0   | 0   |
| >0.50 to 1.00  | 3  | 0   | 3   |
| >1.00 to 2.00  | 144  | 0   | 144   |
| >2.00 to 3.00  | 128  | 0   | 128   |
| >3.00 to 4.00  | 320  | 0   | 320   |
| <b>TOTALS</b>  | <b>595</b>   | <b>0</b>  | <b>595</b>  |

[7]

The highest concentration of each VOC detected in groundwater beneath the property is summarized in Table 5.

**Table 5**

**Sample Summary: Summary of Highest Concentrations of Substances  
Detected in Groundwater at Titeflex Corporation Property**

| Sample,<br>year | Hazardous Substance      | Sample<br>Conc.<br>(µg/L) | Reference<br>Sample, year | Ref.<br>Conc.<br>(µg/L) | Comments     |
|-----------------|--------------------------|---------------------------|---------------------------|-------------------------|--------------|
| MW-T-6D, 1986   | 1,1,1-Trichloroethane    | 1,560                     | MW-T-1S, 1986             | 5 U                     | 312 × SQL    |
| MW-T-6S, 1989   | trans-1,2-Dichloroethene | 620                       | MW-T-10S, 1989            | 5 U                     | 124 × SQL    |
| MW-16D, 1995    | Dichlorodifluoromethane  | 95                        | MW-6D, 1995               | 50 U                    | 1.9 × SQL    |
| MW-13D, 1995    | Trichlorofluoromethane   | 16                        | MW-6D, 1995               | 10 U                    | 1.6 × SQL    |
| MW-16D, 1995    | cis-1,2-Dichloroethene   | 14                        | MW-6D, 1995               | 5 U                     | 2.8 × SQL    |
| MW-6S, 1992     | 1,1,2-Trichloroethane    | 7.1                       | MW-13S, 1995              | 5 U                     | 1.4 × SQL    |
| MW-T-6D, 1988   | 1,1-Dichloroethane       | 5,250                     | MW-T-12D, 1988            | 5 U                     | 1,050 × SQL  |
| MW-T-6D, 1988   | 1,1-Dichloroethene       | 5,750                     | MW-T-12D, 1988            | 5 U                     | 1,150 × SQL  |
| MW-6D, 1995     | Methylene Chloride       | 380                       | MW-T-13D, 1995            | 5 U                     | 76 × SQL     |
| MW-T-9S, 1986   | Toluene                  | 54                        | MW-T-1S, 1986             | 5 U                     | 10.8 × SQL   |
| MW-T-9S, 1995   | Tetrachloroethylene      | 40                        | MW-T-13S, 1995            | 5 U                     | 8 × SQL      |
| MW-T-13D, 1995  | 1,2-Dichloroethane       | 14                        | MW-T-16D, 1995            | 5 U                     | 2.8 × SQL    |
| MW-T-10D, 1988  | Trichloroethene          | 142,000                   | MW-T-12D, 1988            | 2.87                    | 49,477 × SQL |

µg/L = Micrograms per liter.

U = Indicates the compound was analyzed for but not detected and reports the quantitation limit.

SQL = Sample Quantitation Limit.

[5, p. 24-25]

Tighe & Bond was hired by Titeflex to conduct an investigation of the oily metal chip area. A progress report dated April 1986 detailed the installation of five monitoring wells, MW-T-1S to MW-T-5S, and the result of the analysis for oil and grease. Oil and grease was detected in the wells installed, but the concentrations detected were not listed in the report. A sixth well, MW-T-6S, was installed and sampled for oil and grease and for VOCs in June 1986. The laboratory results from Tighe & Bond Environmental Laboratory indicated the following concentrations of VOCs: TCE was detected at 3,670 parts per billion (ppb); 1,2-trans-DCE at 400 ppb; 1,1,1-TCA at 20.6 ppb; toluene at 20.1 ppb; and 1,1-DCE at 6.21 ppb. On 11 July 1986, well MW-T-6S was resampled, and the sample was analyzed by Tighe & Bond Environmental Laboratory for oil and

grease and for VOCs. The laboratory results indicated elevated concentrations of VOCs, but oil and grease was not detected above the method detection limit of 5 ppm. TCE was detected at 7,360 ppb; 1,2-trans-DCE at 561 ppb; 1,1,1-TCA at 50.1 ppb; 1,1-DCE at 14.2 ppb; 1,1-DCA at 45 ppb; and toluene at 2.3 ppb [5, p. 24].

On 2 and 3 December 1986, Tighe & Bond collected groundwater samples from 11 on-site monitoring wells and submitted the samples to Tighe & Bond Laboratory for analysis of VOCs by EPA Method 624 [5, p. 24]. Five VOCs were detected during this sampling round. Highest concentrations were detected in MW-T-10D and included TCE (2,120  $\mu\text{g/L}$ ), and 1,2-trans-DCE (64.4  $\mu\text{g/L}$ ). Additional compounds detected were 1,1-DCA, 1,1-DCE, PCE, and 1,1,1-TCA. These concentrations exceeded MA DEP drinking water standards [5, p. 24]. VOCs were detected in all of the monitoring wells sampled except MW-T-13.

On 23 December 1986, Tighe & Bond collected groundwater samples from three on-site monitoring wells and submitted the samples to Tighe & Bond Laboratory for analysis of VOCs by EPA Method 624. Four VOCs were detected during this sampling round. Highest concentrations were detected in MW-T-6S and included TCE (5,220  $\mu\text{g/L}$ ), and trans-1,2-DCE (52.1  $\mu\text{g/L}$ ). Additional compounds detected were 1,1-DCA, 1,1-DCE, PCE, and 1,1,1-TCA. These concentrations exceeded MA DEP drinking water standards [5, p. 24]. VOCs were detected in all the monitoring wells sampled except MW-T-13.

On 10 September 1987, MA DEP approved Tighe & Bond's proposal to install and sample additional monitoring wells to define the extent of the VOC plume. Tighe & Bond conducted a soil boring and well installation program in the oily metal chip shed and former UST areas. The results of the soil sampling event indicated that oil-and-grease-contaminated soils above MA DEP soil standards were not present in these two areas. The resulting investigation increased the number of wells on site to four deep groundwater monitoring wells and 12 shallow monitoring wells. The wells installed in September 1987 were sampled for the first time in December 1988. The samples collected from the recently installed wells indicated contamination from both oil and grease and from VOCs. Oil and grease ranged from below detection limits to 19.7 milligrams per liter (mg/L). Total VOCs ranged from 5.37 ppb to 12,470 ppb [4, p. 25]

On 18 May 1988, Titeflex notified MA DEP of an ongoing waste cutting oil discharge to a drainage swale on the southeast side of the building. Titeflex estimated that 3,500 gallons of waste cutting oil were released to the swale through the storm drain system. Five groundwater monitoring wells were installed in the right of way for Interstate 291 (the exact location is not known, therefore they are not depicted in Figure 2). Soil and groundwater samples collected from those wells did not have detectable levels of TPH.

On 6 June 1988, Tighe & Bond collected groundwater samples from 15 on-site monitoring wells and submitted the samples to Tighe & Bond Environmental Laboratory for analysis of VOCs by EPA Method 624. In this resampling event, six VOCs were detected in the samples. The highest concentrations were detected in MW-T-10D and included TCE (142,000  $\mu\text{g/L}$ ). Additional compounds detected were 1,1-DCA, 1,1-DCE, cis-1,2-DCE, and 1,1,1-TCA. These concentrations exceeded MA DEP drinking water standards for all compounds except cis-1,2-

DCE [5, p. 25]. VOCs were detected in all of the monitoring wells sampled except MW-T-14D and MW-T-15S, which were below method detection limits.

On 29 June 1988, Tighe & Bond submitted groundwater samples to Tighe & Bond Laboratory for analysis of VOCs. Monitoring wells MW-T-6S and MW-T-6D were sampled for VOCs by EPA method 624. Four VOCs were detected during this sampling round. The highest concentrations were detected in MW-T-6S including TCE (72,800  $\mu\text{g/L}$ ). MW-T-6D contained TCE (4,760  $\mu\text{g/L}$ ), 1,1-DCE (4,060  $\mu\text{g/L}$ ); and 1,1-DCA (2,160  $\mu\text{g/L}$ ). These concentrations exceeded MA DEP drinking water standards [5, p. 25].

In August 1988, Tighe & Bond submitted a Phase II Comprehensive Site Assessment to MA DEP. This assessment identified sources and extent of release of contamination, provided characterization of hazardous materials, and provided a risk assessment. Five areas were identified as potential sources for the chlorinated solvent release. The first area was a drum storage area located adjacent to the automotive inspection area and to well MW-2S. The second area was a large degreasing TCE AST formerly located within the parts cleaning and anodizing area, which utilized TCE prior to 1987. The third area was a floor drain that may have transported chlorinated solvents with wastewater to the municipal sewerage system. The fourth area was the current drum storage area located on the north side of the building. The fifth area was a drum storage area located near the Teflon extruding area within the building [5, p. 8]

On 2 June 1989, Tighe & Bond collected groundwater samples from 10 on-site monitoring wells and submitted the samples to Tighe & Bond Environmental Laboratory for analysis of VOCs by EPA Method 624. Five VOCs were detected during this sampling round. The highest concentrations were detected in MW-T-6S including TCE (2,400  $\mu\text{g/L}$ ), and trans-1,2-DCE (620  $\mu\text{g/L}$ ). Additional compounds detected included 1,1-DCA, 1,1-DCE, PCE, and 1,1,1-TCA. These concentrations exceeded MA DEP drinking water standards except for 1,1,1-TCA [5, p. 25]. VOCs were detected above method detection limits in all of the monitoring wells sampled except MW-T-13S. As of 20 June 1989, a total of 25 groundwater monitoring wells were installed on or adjacent to the Titeflex facility (Figure 2).

Remedial response actions for a VOC contaminated groundwater plume emanating from the Titeflex Corporation site pursuant to the 1988 Massachusetts Contingency Plan (MCP) were undertaken by Tighe & Bond. Soil gas monitoring was conducted by Tighe & Bond in January 1994 and September 1996. TCE was not detected in any sample point during these sampling events; however, tetrachloroethene (PCE) was detected at two off-site sample points during both sampling events. Tighe & Bond stated that based on the locations of these points, the presence of PCE at the off-site locations was not associated with the Titeflex release [28, p. 2].

Tighe and Bond personnel monitored groundwater conditions at the site in April 1994, June 1995, November 1995, and September 1996. Six monitoring wells (MW-6S, MW-6D, MW-13S, MW-13D, MW-16S, and MW-16D) were sampled for VOCs during this time. Groundwater samples were submitted to Commonwealth Analytical of Westfield, Massachusetts for VOC analysis using EPA Method 8010. Nine VOCs were detected during these sampling rounds, including dichlorodifluoromethane, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethene (1,1-DCE), methylene chloride, tetrachloroethene (PCE), 1,1,2-trichloroethane (1,1,2-TCA), trichloroethene (TCE), and trichlorofluoromethane [28, Table 1]. Methylene chloride was also detected in the laboratory blank, therefore this compound is considered to be a laboratory contaminant. In five of the monitoring wells (MW-6S, MW-6D, MW-13S, MW-13D, and MW-16S), the concentrations of VOCs decreased or remained relatively equivalent to previous sampling rounds [28, p. 3, Table 1]. In MW-16D, concentrations of TCE increased from 770 µg/L in July 1992 to 2,300 µg/L in September 1996; however, the increased level is slightly less than the concentration detected in 1992 at MW-6S [28, p. 3, Table 1].

The source of the VOC contamination on the property has not been conclusively determined. Results from previous investigations conducted by Tighe & Bond on the property concluded that the VOC contamination found in on-site monitoring wells is generally believed to have resulted from the on-site use of TCE in connection with former operations conducted at the Titeflex Building. These operations included the use of organic solvents, such as industrial grades of TCE for cleaning metal parts. The source of the groundwater contamination is believed to be the former TCE degreasing tank. No indication of direct disposal for organic solvents on site or through the storm sewer line has been documented. Other VOCs, 1,1-DCE, 1,1-DCA, and 1,1,1-TCA, are suspected of having been present as impurities in the initial TCE product or as degradation products. PCE has also been identified in groundwater samples collected from the site, but Tighe & Bond has not attributed it to the site [9, p. 2]. Methylene chloride, which was also found in the laboratory blank, has also been detected in groundwater samples, but may not be associated with any specific process or source on site.

Based on the results of a Phase II Comprehensive Site Assessment, Disposal Site Risk Characterization, Phase III Report, and periodic soil gas and groundwater monitoring program, it is the opinion of Titeflex and Tighe & Bond that the remedial response actions undertaken by Titeflex constitute a permanent solution to the documented release pursuant to the 1993 MCP [28, p. 3].

START did not perform groundwater sampling as part of the Titeflex Corporation SIP. Analysis of samples previously collected from on-site monitoring wells by Tighe & Bond indicates that VOCs and oil and grease have been released to the overburden aquifer. The nearest residence is located 750 ft northwest of the Titeflex property. According to CENTRACTS data, three people are served by groundwater drinking supplies within 1-radial mile of the property, and 595 people are served by groundwater supplies within 4-radial miles of the property [7]. However, based on the location and lack of residential wells, no nearby drinking water sources are known or suspected to have been impacted by the release from on-site sources.

## SURFACE WATER PATHWAY

The Titeflex property is located in the Connecticut River Valley [4, p. 1]. Surface water runoff and stormwater runoff from the property are collected on the paved areas and are directed to a series of storm drains. The storm drains flow to the northwest along Hendee Street in the town storm drain system and eventually discharge into the Connecticut River [6]. The 15-mile surface water pathway starts at the probable point of entry (PPE) located where Park Street intersects the Connecticut River, approximately 2.5 miles southwest of the Titeflex property and the terminus is in the Connecticut River approximately 3 miles north of Hartford, Connecticut (Figure 3) [6].

The Titeflex property is located in Flood Zone C, an area outside of the 500-year floodplain [10]. Based on the property features, possible contaminants may have been transported overland into catchbasins on the Titeflex property [6].

Based on the National Wetlands Inventory Maps there are no wetlands on the Titeflex property and approximately 1.3 miles of wetland frontage have been estimated along the 15-mile downstream pathway [11-14].

The nearest surface water body to the Titeflex property is a small unnamed pond located approximately 2,800 ft to the southeast of the property. Other surface water bodies located within 1.0 miles of the property include Abbey Brook, located approximately 3,000 ft to the northwest, and an unnamed pond 4,500 ft to the southeast [1]. The aforementioned surface water bodies are not located on the 15-mile downstream surface water pathway. Table 6 summarizes surface water bodies located along the 15-mile downstream pathway.

**Table 6**

**Surface Water Bodies Along the 15-mile Downstream Pathway  
from Titeflex Corporation**

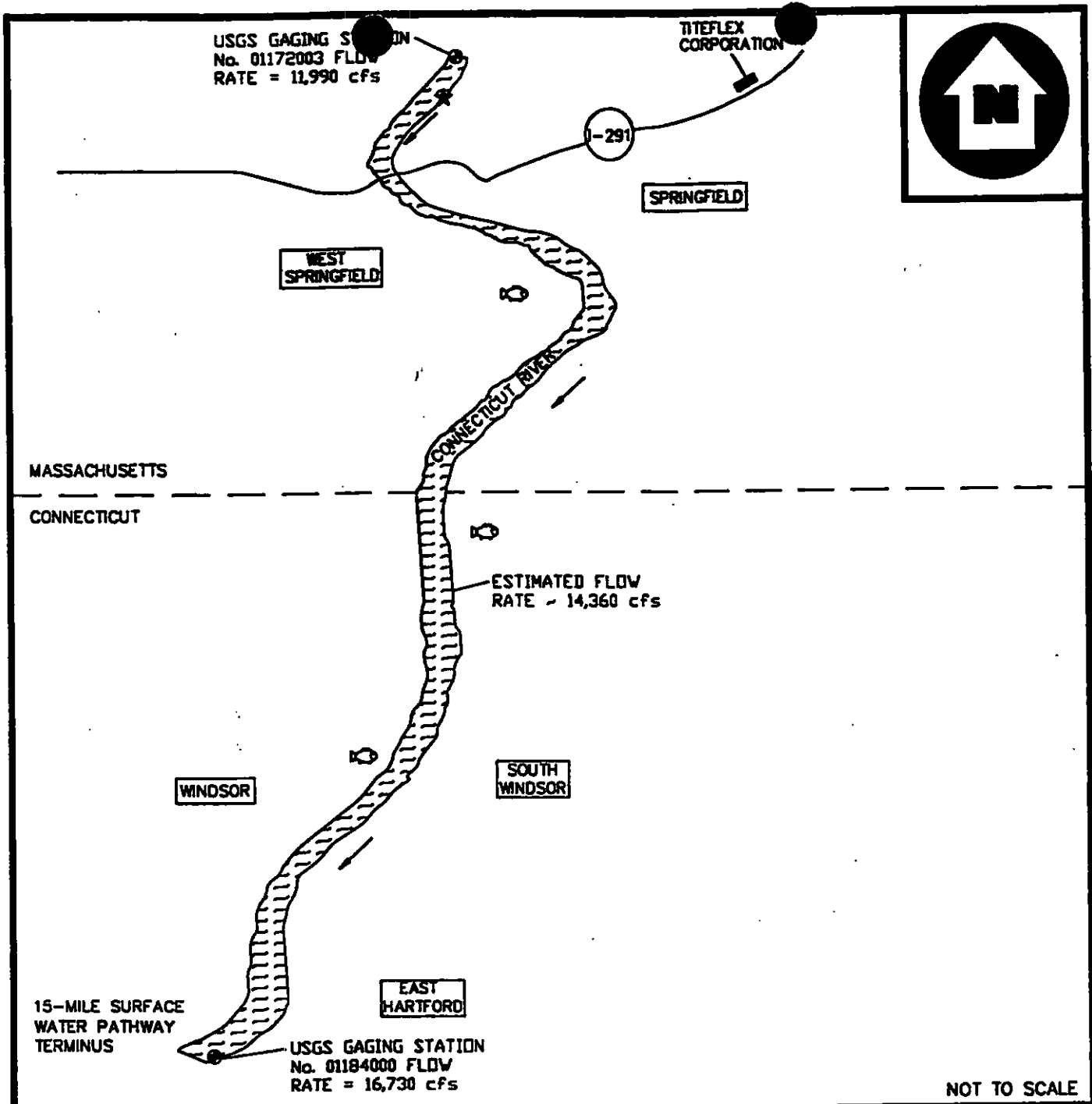
| Surface Water Body | Descriptor <sup>a</sup> | Length of Reach | Flow Characteristics (cfs) <sup>b</sup> | Length of Wetland Frontage (miles) |
|--------------------|-------------------------|-----------------|---|------------------------------------|
| Connecticut River  | Large River             | 15 miles        | 11,990 - 16,730                         | 1.3                                |

<sup>a</sup> Minimal stream < 10 cfs. Small to moderate stream 10-100 cfs. Moderate to large stream > 100-1,000 cfs. Large stream to river > 1,000-10,000 cfs. Large river > 10,000-100,000 cfs. Very large river > 100,000 cfs. Coastal tidal waters (flow not applicable). Shallow ocean zone or Great Lake (flow not applicable). Moderate depth ocean zone or Great Lake (flow not applicable). Deep ocean zone or Great Lake (flow not applicable). Three-mile mixing zone in quiet flowing river 10 cfs or greater.

<sup>b</sup> Cubic ft. per second.

[15]

The United States Geologic Survey (USGS) has maintained a gaging station (No. 01172003) along the Connecticut River approximately 3 miles upstream of the Titeflex property. The average discharge for the Connecticut River, recorded at the USGS gaging station, is 11,990 cubic ft per



# LEGEND

▲ WETLANDS

★ PROBABLE POINT OF  
ENTRY TO SURFACE  
WATER



FLOW DIRECTION

cfs

CUBIC FEET PER SECOND



STATE BOUNDARY



PROPERTY



USGS GAGING STATION



FISHERY

SOURCE: U.S.G.S. QUADRANGLE(S): SPRINGFIELD, MA (1987)  
HARTFORD, CT (1994)

## SURFACE WATER PATHWAY

TITEFLEX CORPORATION  
603 HENDEE STREET  
SPRINGFIELD, MASSACHUSETTS



REGION 1 SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM

TDD #  
98-05-0161

DRAWN BY:  
J. BLANCHARD

DATE  
3/16/98

FILE NAME:  
S:\97110004\FIG3.DWG

FIGURE 3



second (cfs) [15]. A second stream gauging station, located 12.5 miles downstream of the Titeflex property on the Connecticut River (No. 01184000), records an average discharge of 16,730 cfs [15].

The Connecticut River is a fishery and is used for recreational purposes [15]. Sensitive environments located along the 15-mile downstream pathway from the Titeflex property are described in Table 7. Approximately 1.3 miles of wetlands border water bodies within the downstream pathway. The habitats of five species classified as State-threatened, State-endangered, or Federally-endangered, are present within the downstream pathway [8].

**Table 7**

**Sensitive Environments Along the 15-Mile Downstream Pathway from  
Titeflex Corporation**

| Sensitive Environment Name | Sensitive Environment Type | Surface Water Body | Downstream Distance From PPE (miles) | Estimated Flow Rate at Environment (cfs) |
|----------------------------|----------------------------|--------------------|--------------------------------------|--|
| Connecticut River          | Clean Water Act            | Connecticut River  | 0                                    | 11,990                                   |
| Animal                     | Federal Endangered         | Connecticut River  | 0.27                                 | 11,990                                   |
| Wetlands (1.3 miles)       | Wetlands                   | Connecticut River  | 7                                    | 14,202                                   |
| Plant                      | State Threatened           | Connecticut River  | 7.35                                 | 14,312                                   |
| Plant                      | State Threatened           | Connecticut River  | 7.75                                 | 14,439                                   |
| Plant                      | State Endangered           | Connecticut River  | 7.8                                  | 14,454                                   |
| Plant                      | State Threatened           | Connecticut River  | 7.89                                 | 14,483                                   |

cfs = cubic feet per second  
PPE = Probable Point of Entry

[8; 11-15]

There are no surface water drinking water intakes located along the 15-mile downstream pathway from the Titeflex property [15]. The Connecticut River is classified as restricted; therefore, surface water intakes are prohibited [15].

In June 1989, Titeflex hired Clean Harbors to pump approximately 1,200 gallons of oil from the storm drain system. The storm drain system was then re-routed and connected to the city storm drain system. Surface water samples from the small intermittent brook in the swale revealed TPH

concentrations of 1.1 ppm at the culvert where the storm drain enters the swale, 0.2 ppm 800 ft downstream from the culvert, and 17 ppm 1,600 ft downstream from the culvert. The most visibly impacted sediments in the swale covered an area approximately 8 ft wide, 3 to 4 ft deep, and 40 ft long, extending from the culvert outlet. Soil/sediment samples collected from this area contained up to 38,000 ppm TPH at a depth of 0 to 6 inches, and non-detect levels at a depth of 4.5 ft. No other analyses were conducted on these sediment samples. Since the drainage swale is not a permanent water body, it was not evaluated as part of the surface water pathway.

There are no on-site surface water bodies, and all surface water on the site is collected by a series of stormwater drains and discharged to the Connecticut River approximately 2.5 miles southwest of the property [20]. No wetlands were identified by START personnel during the on-site reconnaissance [6]. To date, no known releases to surface water bodies have occurred, and no sensitive environments are known or suspected to have been impacted.

## **SOIL EXPOSURE PATHWAY**

There is no resident population associated with the Titeflex property. There are approximately 520 full-time workers on the Titeflex property [21]. The nearest residences are located on Page Boulevard at the junction of Hendee Street, approximately 750 ft northwest and topographically upgradient of the Titeflex property [6, p. 2]. The area surrounding the property is zoned commercial C-3 [6, p. 2].

There are no known schools or day-care facilities located within 200 ft of the Titeflex property [6, p. 2]. The Pottenger, Bowles, and Dorman Elementary Schools and Van Sickle Junior High School are located within a 1-mile radius of the property. The Pottenger School is located 0.6 miles northwest, the Bowles School is located approximately 0.8 miles northeast, the Dorman School is located 1.0 mile southeast, and the Van Sickle Junior High School is located approximately 0.8 miles west of the Titeflex property [3]. There are an estimated 11,094 people living within 1-radial mile of the Titeflex property [7].

Soil samples were collected from the Titeflex property during three separate sampling events conducted between 12 - 13 December 1986, and 25 - 29 May 1989, and 12 December 1993. Soil samples collected during the 1986 sampling event were analyzed for oil and grease, those collected in 1989 were screened for VOCs, and those collected in 1993 were analyzed for VOCs, TPH, and metals [4, p. 2-14; 28, p. 2].

On 25 May 1989, hand-augered shallow soil samples were collected from 12 to 24 inches below ground surface from five areas. The five areas were the former drum storage area adjacent to MW-T-2S (Area No.1), the former degreasing tank (Area No.2), a floor drain that was connected to the sewer system (Area No.3), the current drum storage area (Area No.4), and the extrusion area and former drum storage area (Area 5) [5, p. 9].

On 6 June 1989, Tighe & Bond collected additional soil samples at the same locations collected on 25 May 1989 at depths ranging from 0.5 to 1 ft. The soil samples were collected and headspace analysis was conducted by the Tighe & Bond Laboratory. The results from drum

storage areas No. 1 and 4 were below the method detection limit of 0.05 ppm. TCE was detected at 1 ppm at drum storage area No. 5, and 7 ppm at drum storage area No. 3. TCE was detected at 30 ppm at Area No. 2 adjacent to the degreasing AST. A soil sample from the former degreasing AST area was also submitted for VOC analysis at Tighe & Bond Laboratory by EPA method 624; TCE was detected at 1.8 ppm. No additional samples were submitted for analysis to determine background concentrations or areal extent of the soil contamination. Tighe & Bond concluded that the source of the TCE contamination at this property was likely from the former degreasing AST [5, p. 9].

Tighe & Bond, on behalf of Titeflex Corporation, submitted a Waiver Application Form to MA DEP for the Titeflex Corporation site on 9 August 1993, and MA DEP granted approval of the waiver on 29 October 1993 [27, p. 1]. Response actions at the site were conducted as an Interim Measure under the provisions of the 1988 MCP. A Response Action Outcome (RAO) statement was filed in lieu of a Waiver Completion Statement relative to the release of petroleum into the drainage swale located along the eastern side of the Titeflex facility.

Eight soil/sediment samples were collected by Tighe & Bond from the drainage swale at locations both upgradient and downgradient of a 42-inch diameter culvert through which the release of petroleum occurred [27, p. 1]. Although Tighe & Bond refers to these as soil/sediment samples, these samples are considered to be soil samples, and will be referred to as soil samples throughout this report. Samples were collected at depths between 0 and 12 inches and 12 and 24 inches at four locations. An upgradient reference sample (SW-1), collected 25 feet upgradient (northeast) of the culvert outfall, was collected to represent background conditions. Samples were also collected at the culvert outfall (SW-2), 25 feet downgradient (southwest) of the culvert outfall (SW-3), and 75 feet downgradient of the culvert outfall (SW-4) [27, p. 1]. The samples were submitted for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and metals (13) analyses. Six metals including cadmium (7.2 ppm), chromium (82 ppm), copper (320 ppm), lead (1,100 ppm), silver (5 ppm), and zinc (500 ppm), two VOCs including toluene (41 µg/L) and 1,1,1-trichloroethane (23 µg/L), and TPH (84,000 ppm) were detected at concentrations exceeding the background sample's (SW-1) detection limit or occurring at three times or greater than the background concentration [27, p. Appendix A].

Interim Measures were performed at the site, and included the excavation of shallow (0 to 12 inches) contaminated soils downgradient from the culvert outfall until TPH concentrations of 2,400 mg/kg (background concentrations) were achieved and the collection of post-excavation confirmatory samples to verify that the cleanup was achieved.

On 28 March 1995, Environmental Products and Services, Inc. (EPS) excavated contaminated soil in the drainage swale to a depth of 1.5 feet from the culvert outfall to a distance of approximately 75 feet downgradient of the outfall. The width of the excavated area was between 8 and 10 feet. Approximately 64.5 tons of contaminated soils were excavated and transported to the Theodore Ondrick Construction Company's asphalt batching facility in Chicopee, Massachusetts. Following excavation activities, wetland restoration activities were conducted by EPS [27, p. 3].

During excavation activities, Tighe and Bond personnel collected 21 grab soil samples from the floor and sidewalls of the excavation and six composite soil samples from trucks transporting the

contaminated soil and submitted the samples to Commonwealth's Analytical on-site mobile laboratory for TPH analysis using EPA Method 418.1. Samples collected from the excavated area ranged in TPH concentrations from less than 20 to 24,000 mg/kg, while the composite samples ranged in concentration from 3,800 to 24,000 mg/kg [27, Appendix A]. Confirmation samples were also collected from the floor and sidewalls of the excavation and submitted to Commonwealth Analytical base laboratory for TPH analysis using EPA Method 8015 and total lead analysis using EPA Method 6010. TPH concentrations from these confirmation samples ranged from non-detect to 880 mg/kg and lead concentrations ranged from less than 5 to 140 mg/kg [27, p. 4]. These confirmatory analyses indicated that concentrations of TPH and lead were below three times the reference concentrations of 7,200 and 570 mg/kg, respectively. Confirmatory analysis for other metals was not performed.

Based on a Method 1 MCP risk characterization, Tighe and Bond determined that a condition of No Significant Risk of Harm to Health, public welfare and the environment had been achieved at the site [27, p. 5].

Analysis of samples previously collected by Tighe & Bond indicates that VOCs have been detected in on-site soils. No schools or day-care facilities are present within 200 feet of observed contamination, and 520 full-time workers are present on the Titeflex property. Additionally, no known terrestrial sensitive environments are present on the property. The property is completely paved, property access restricted, and the distance to nearest residence is approximately 750 ft northwest of the Titeflex property. No impacts to nearby residential populations are known or suspected. Soil (source) sample results documented contamination on the property; however, all known areas of surficial soil contamination on site were remediated, and no new areas of surficial soil contamination have been identified in subsequent sampling events [27, p. 2].

## **AIR PATHWAY**

There are approximately 520 full-time workers on the Titeflex property. The nearest residence is located on Page Boulevard at the junction of Hendee Street, approximately 750 ft northwest and topographically upgradient of the Titeflex property [6, p. 3].

There are no known schools or day-care facilities located within 200 ft of the Titeflex property [6, p. 2]. The Pottenger, Bowles, and Dorman Elementary Schools as well as the Van Sickle Junior High School are located within a 1-mile radius of the property. The Pottenger School is located approximately 0.6 miles northwest, the Bowles School is located approximately 0.8 miles northeast, the Dorman School is located approximately 1.0 mile southeast, and the Van Sickle Junior High School is located approximately 0.8 miles west of the Titeflex property [3, p. 1].

The population located within 4-radial miles of the Titeflex property, including on-site workers, is 198,365. The population within 4-radial miles of the property was estimated using equal distribution calculation of U.S. Census CENTRACTS data identifying population, household, and private water wells for "Block Groups" which lie wholly or in part within individual radial distance rings measured from potential sources on the property. The population within 4-radial miles of the property is summarized in Table 8.

**Table 8**

**Estimated Population Within 4-Radial Miles of Titeflex Corporation**

| Radial Distance From the Titeflex Corporation (miles) | Estimated Population |
|---|----------------------|
| On a Source*  | 520                  |
| > 0.00 to 0.25  | 222                  |
| > 0.25 to 0.50  | 1,626                |
| > 0.50 to 1.00  | 9,246                |
| > 1.00 to 2.00  | 44,720               |
| > 2.00 to 3.00  | 69,445               |
| > 3.00 to 4.00  | 72,586               |
| <b>TOTAL</b>  | <b>198,365</b>       |

\*The on-site worker population of 520 has been included in the "on a source" category.  
[7; 21]

Table 9 summarizes the sensitive environments located within 4-radial miles of the Titeflex property. There are approximately 945 acres of wetlands located within 4-radial miles of the Titeflex property.

**Table 9**

**Sensitive Environments Located Within 4-Radial Miles of Titeflex Corporation**

| Radial Distance from Titeflex Corporation (miles) | Sensitive Environment/Species (status)  |
|---|---|
| On a Source                                       | None  |
| > 0.00 to 0.25                                    | None  |
| > 0.25 to 0.50                                    | 35 acres of wetlands  |
| > 0.50 to 1.00                                    | 30 acres of wetlands<br>Clean Water Act   |
| > 1.00 to 2.00                                    | 265 acres of wetlands   |
| > 2.00 to 3.00                                    | 235 acres of wetlands<br>3 State Endangered Species<br>1 Federal Endangered Species |
| > 3.00 to 4.00                                    | 380 acres of wetlands   |

[11; 12; 13; 14]

Ambient air monitoring was conducted using a photoionization detector (PID) during the START on-site reconnaissance. No PID concentrations recorded during the on-site reconnaissance were above background levels in the ambient air [6, p. 5].

According to historical information, no quantitative air sampling has been conducted on the Titeflex property. There are 520 full-time workers present on the property; however, no schools or day-care facilities are located within 200 feet of observed contamination. For the purposes of this evaluation, it should be noted that the results of the soil gas sample analysis conducted at the property are not considered representative of ambient air conditions.

No laboratory qualitative air samples are known to have been collected from Titeflex Corporation. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations or sensitive environments are known or suspected.

## SUMMARY

Titeflex Corporation (Titeflex) is located in Springfield, Hampden County, Massachusetts. The property is bound by railroad tracks to the west, the Indian Motorcycle Museum to the south, Interstate 291 to the southeast, and a trucking company and commercial lot to the north. The property includes a single-story building which contains offices and manufacturing areas, a research and design building, three metal storage cargo boxes, a hazardous waste storage area, an exterior drum storage area, a paved parking area, and landscaped areas. The north section of the building is subleased to Solar Metal Treating Corp. Other property features include a drainage swale; a metal chip area; a former degreasing tank; three soil piles; a 2,000-gallon cutting oil underground storage tank (UST); a 20,000-gallon fuel oil UST; a 10,000-gallon UST containing Isopar-G; an area that contained two former 5,000-gallon USTs containing fuel oil; an area that contained a 500-gallon aboveground storage tank (AST), and a 1,500-gallon AST containing buffered water.

From 1951 to the present, Titeflex has manufactured Teflon tubing, rubber tubing, and metal fittings. Substances historically used on the property for manufacturing purposes include trichloroethylene (TCE), bromide, acids, xylene, toluene, glycerine, naphtha, methylene chloride, nickel salt, potassium ferrocyanide, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethylene, and toluene. The use of TCE as a degreaser was discontinued in 1988, and TCE was replaced by freon in the degreasing operations.

Sources suspected to have contributed to volatile organic compound (VOC) contamination in the groundwater and subsurface soils (< 2 feet) include the former degreasing tank located in the center of the Titeflex building where the TCE AST was located. Contaminated soil in the drainage swale south of the Titeflex building resulted from the discharge of waste cutting oil from processes occurring on the property.

The total population served by public groundwater supply wells within 4-radial miles of the property is estimated to be 0. The nearest private well to Titeflex is located greater than 0.5 miles away from Titeflex. From 1986 to 1996, groundwater samples collected from monitoring wells on or near the Titeflex property have been found to contain 14 VOCs, with concentrations as high as 142 parts per million for TCE.

Remedial response actions for a VOC-contaminated groundwater plume emanating from Titeflex pursuant to the 1988 MCP were undertaken by Tighe & Bond. Soil gas monitoring and groundwater monitoring were conducted by Tighe & Bond between January 1994 and September 1996. TCE was not detected during the soil gas monitoring program; however, tetrachloroethene (PCE) was detected at two off-site sample points. The presence of PCE at the off-site locations was not believed by Tighe & Bond to be associated with the TCE release at the Titeflex facility. Nine VOCs were detected during the groundwater monitoring program, which included six monitoring wells. In five of the monitoring wells, the concentrations of VOCs decreased or remained relatively equivalent to previous sampling rounds. In one monitoring well, the concentrations of TCE increased from 1992 to 1996.

The property is located approximately 13,200 feet east of the Connecticut River. Surface water runoff from the property collects in the storm drains and flows west along Page Boulevard and into the town storm drain system. The town storm drain system drains to the west and eventually into the Connecticut River. There are no surface water drinking water intakes located along the 15-mile downstream surface water pathway. Approximately 1.3 frontage miles of wetlands occur along the downstream pathway.

An estimated 11,094 people reside within 1-radial mile of the property. The nearest residence is located 750 feet northwest of the property. There are approximately 520 full-time employees on the property. The nearest school or day-care facility is located in the Pottenger School, located 0.6 miles northwest of the property. There are no terrestrial sensitive environments located partially or wholly on the Titeflex property.

Analytical data from surface soil (source) samples collected from Titeflex between 1986 and 1988 indicated releases of hazardous substances to surficial soils from on-site sources. A Waiver Application Form was submitted to the MA DEP for the Titeflex Corporation site and MA DEP granted approval of the waiver. Response actions at the site were conducted as an Interim Measure under the provisions of the 1988 Massachusetts Contingency Plan (MCP). A Response Action Outcome (RAO) statement was filed in lieu of a Waiver Completion Statement relative to the release of petroleum into the drainage swale. Surficial soil/sediment samples were collected from the drainage swale where the release of petroleum occurred and analyzed for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and metals. Six metals, two VOCs, and TPH were detected at concentrations exceeding background levels.

Approximately 64.5 tons of contaminated soils were excavated and transported to the Theodore Ondrick Construction Company's asphalt batching facility in Chicopee, Massachusetts. Following excavation activities, wetland restoration activities were conducted. Confirmatory analyses indicated that concentrations of TPH and lead were below reference concentrations. Confirmatory analysis for other metals was not performed. Based on a Method 1 MCP risk characterization, a condition of No Significant Risk of Harm to Health, public welfare and the environment had been achieved at the site.

Based on the site observations and conditions, and the distance to the nearest residence (approximately 750 feet northwest), no resident population exists and no impacts to nearby populations are known or suspected. The drainage swale and oily metal chip areas of surficial soil contamination on site were remediated, and no new areas of surficial soil contamination have been identified in subsequent sampling events.

An estimated 198,365 people reside, and 945 acres of wetland occur, within 4-radial miles of the property. No laboratory qualitative air samples are known to have been collected from Titeflex. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations or sensitive environments are known or suspected.



In summary, remedial activities at Titeflex have included the removal of the one TCE AST, removal of contaminated soil in the drainage swale, removal of contaminated soil from the oily metal chip area, and removal of contaminated soil adjacent to the former fuel oil tanks. A Waiver Application Form was submitted to and approved by MA DEP for the Titeflex site.

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